

REMARKS

Reconsideration and allowance of the present patent application based on the following remarks are respectfully requested.

By this Amendment, claims 1 and 5-6 are amended, claims 4, 7-12 and 14 are cancelled without prejudice or disclaimer to the subject matter therein and claims 15-16 are newly added. Claim 1 has been amended to recite the features of allowable claim 4. No new matter has been added. Accordingly, after entry of this Amendment, claims 1-3, 5-6, 13 and 15-16 will be pending in the patent application.

Claims 1-3 and 13 were rejected under 35 U.S.C. §103(a) based on Zurcher *et al.* (U.S. Pat. No. 6,344,413) (hereinafter “Zurcher”) in view of Kim (U.S. Pub. No. 2002/0185671) (hereinafter “Buchanan”). The rejection is respectfully traversed.

Claim 1 is amended to recite the features of allowable claim 4. Accordingly, Applicant respectfully submits that claim 1 is allowable.

Claims 2, 3 and 13 are patentable over the cited portions of Zurcher, Kim and any proper combination thereof at least by virtue of their dependency from claim 1 and for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 1-3 under 35 U.S.C. §103(a) based on Zurcher in view of Kim are respectfully requested.

Claims 15 and 16 are newly added to define additional subject matter that is novel and non-obvious. Support for new claims 15 and 16 can be found throughout the original disclosure.

Claim 15 recites a barrier structure for copper metallization structure, comprising “a Cu layer disposed on a substrate; a dielectric pattern disposed between the substrate and the Cu layer; a first Ru layer disposed between the dielectric pattern and the Cu layer; an oxide film disposed between the first RU layer and the Cu layer; and a second Ru layer disposed between the oxide film and the Cu layer, wherein the oxide film is made of RuxOy.” The cited portions of Zurcher, Kim and any proper combination do not disclose, teach or suggest these features.

By way of review, the cited portions of Zurcher disclose a method for forming a capacitor that includes a first capacitor electrode layer 70, a capacitor dielectric layer 75 and a second capacitor electrode layer 80. *See* Zurcher at FIG. 7. As conceded by the Office Action, the cited portions of Zurcher fail to disclose, teach or suggest the material of the contact plug 110. However, there are additional aspects that are absent in the cited portions of Zurcher. For example, the cited portions of Zurcher do not teach or render obvious that the

oxide film is made of RuxOy. The cited portions of Zurcher merely disclose that the “capacitor dielectric layer 75 may be composed of barium strontium titanate (BST), barium titanate (BTO), strontium titanate (STO), lead titanate (PT), lead zirconate (PZ), lead zirconate titanate (PZT), lead lanthanum zirconate titanate (PLZT), strontium bismuth tantalate (SBT), strontium bismuth niobate (SBN), or strontium bismuth niobate tantalate (SBNT). Preferably for DRAM applications the capacitor dielectric layer 75 may include atoms of BST or strontium titanate (ST).” *See* Zurcher at col. 3, lines 45-53.

The cited portions of Kim do not remedy the deficiencies of Zurcher. The cited portions of Kim disclose a capacitor structure that includes a barrier metal layer 20, a first conductive layer 21, an insulating film 22 and a second conductive layer 23. *See* Kim at paragraph 47 and FIG. 1c. However, unlike claim 15, the cited portions of Kim disclose that “[t]he insulating film 22 is formed of a Ta oxide, a Ba--Sr--Ti oxide, a Zr oxide, a HF oxide, a Pb--Zn--Ti oxide or a Sr--Bi--Ta oxide by a CVD, a PVD, or an ALD method.” *See* Kim at paragraph 53. Thus, any proper combination of the cited portions of Zurcher and Kim cannot result, in any way, in the invention of claim 15.

Claim 16 is patentable over the cited portions of Zurcher, Kim and any proper combination thereof at least by virtue of its dependency from claim 15 and for the additional features recited therein.

Accordingly, Applicant respectfully submits that claims 15 and 16 are in condition for allowance.

Claims 4-6 were objected to but would be allowable if rewritten in independent form. Claim 4 is cancelled without prejudice or disclaimer. Claims 5-6 have been amended to change their dependency from claim 4 to claim 1. In view of the above, claims 5-6 are in condition for allowance.

In view of the foregoing, the claims are now believed to be in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

LEE -- 10/730,941

Attorney Docket: 021906-0306952

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP


CHRISTOPHE F. LAIR

Reg. No. 54248

Tel. No. 703.770.7797

Fax No. 703.770.7901

ERH/CFL/smm
P.O. Box 10500
McLean, VA 22102
(703) 770-7900